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SCHEDULE OF MEETINGS

6-13 January	**Standing Committee on Administration and Finance of the Executive Board, Geneva**
14 January (approximately 2-3 weeks)	**Twenty-first session of the Executive Board, Geneva**
24-28 February	**Expert Committee on Medical Rehabilitation, Geneva**
10-15 March	**Expert Committee on Sanitation of International Airports, Geneva**
17-19 March	**Regional Seminar on Venereal Diseases, Tokyo**
14-19 April	**Study Group on Mental Health Problems of Automation, Geneva**

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SMALLPOX VACCINATION IN LATIN AMERICA

Seminar on Smallpox Vaccination

Smallpox is still a public health problem in the Americas, although it has been eradicated in some countries. In 1950, the magnitude of the problem led the directors of the Pan American Sanitary Organization to recommend that Member States should develop mass smallpox vaccination and revaccination programmes in their respective national territories, the ultimate aim being to eradicate the disease throughout the Americas. Subsequently, a special fund was established for the implementation of a continent-wide smallpox eradication programme.

In order to encourage the American countries to take action, the Pan American Sanitary Bureau, which acts as the WHO Regional Office, arranged to co-operate with them in planning smallpox vaccination campaigns which, in due course, would be integrated into the general health services of the respective countries—the ultimate objective being eradication of the disease throughout the hemisphere.

As the first stage of this programme, PASB/WHO encouraged the production in the various countries of high quality smallpox vaccine capable of withstanding the climate and the transport conditions prevailing over large areas of the continent, and supplied a number of national laboratories with the equipment for producing this type of vaccine. The services of specialists in the preparation of the product were also made available; technical information on the subject was circulated; fellowships for training in modern production methods were awarded to the technicians responsible for the production of the vaccine, and a laboratory of international repute was appointed to carry out potency, purity and safety tests.

PASB/WHO also made available the services of specialists in the organization and development of vaccination campaigns. To facilitate the preparation and implementation of the campaigns, a handbook on smallpox vaccination programmes was prepared and distributed in 1956. It contains information on the various factors to be borne in mind in the planning and organization of vaccination campaigns, and on their successive phases. It also contains instructions on vaccination techniques and model forms for use in campaigns.

In some American countries, laboratories have been preparing glycerinated and dried vaccines for use in national campaigns, and even, in some instances, for export to other countries of the American continent.

However, as the production and control techniques adopted in the different laboratories varied in certain respects, while the control tests carried out by the competent international laboratory brought to light considerable discrepancies between the vaccines they produced (and even between different batches produced by the same laboratory), a seminar was organized for workers engaged in the production and control of the vaccines in the various countries.

The fundamental purposes of this seminar were to permit an exchange of views and experiences, to reach an agreement on the advantages and disadvantages of certain technical processes used in production, and to establish uniform control methods so as to obtain comparable results. The seminar, which also provided an opportunity for discussing laboratory methods for the diagnosis of smallpox, and for analysing the results obtained in campaigns with the various types of vaccine, was held in the National Public Health Institute, Lima, Peru, from 20 to 25 August 1956. There were nineteen participants and observers, from ten American countries, and a number of eminent scientists of world repute in this particular field were present in an advisory capacity.

There were two types of meeting, i.e., round-table conferences for the discussion of a particular subject at each meeting, and

practical demonstrations of certain production techniques. The *Bulletin of the Pan American Sanitary Bureau* [1] published the papers submitted on the various subjects, with a summary of the discussions, and the conclusions and recommendations.

The principal communications covered: preparation of glycerinated calf and sheep lymph; the use of antibiotics for the destruction of secondary germs; the preparation and application of dried vaccine; the preparation of vaccine in the chick-embryo and on tissue cultures; safety, potency and purity testing of the vaccines; principles for the standardization of the vaccines and for laboratory diagnosis of smallpox. We give hereunder a summary of the views expressed by the experts on some important questions relating to vaccination, and of the discussions by the participants in the seminar.

Selection of animals for lymph production

As a general rule, for the preparation of the vaccine lymph, it is preferable to use calves weighing 120-150 kg, and of a light colour since the appearance of the vaccine is affected by the animal's pigmentation. Inoculated animals must be perfectly clean, particularly when the lymph is being extracted. It would be interesting to study the advisability of administering antibiotics to inoculated animals so as to obtain lymph with a low content of contaminating bacteria. The incubation period in the calf varies according to the country. It is recommended that the extraction be carried out before the pustules break or dry up. Some laboratories prefer the sheep to the calf for vaccine production as the sheep is less subject to tuberculosis, and, indeed, generally more resistant to disease. It is, moreover, easier to handle, and it is also cleaner, since its faeces are solid.

When the sheep is used, the lymph is extracted four days after inoculation. Some 125 g to 150 g of lymph are normally produced from one calf, and 100 g from a sheep. Whichever animal is used, care must be taken to ensure that the scarification is superficial, so as to avoid the possibility of the virus becoming adapted to other tissue.

Use of antibiotics

In his report on dried vaccines, Dr A. Sousa Iglesias points out that, although attempts to purify lymph with antibiotics have often given contradictory results, certain conclusions can nevertheless be drawn. First, the bacteriostatic effect of the antibiotics used during the preparation of dry vaccines is only temporary. Moreover, if a massive dose of antibiotic is used, the potency of the vaccine is lowered; sometimes also, antibiotics eliminate certain micro-organisms while encouraging the growth of others. However, most of the micro-organisms which contaminate lymph are sensitive to chloramphenicol. Although penicillin has an antibiotic action on certain adventitious micro-organisms, it produces little or no effect on many of them.

Dried vaccines

Glycerinated lymph, which may be affected or inactivated by high temperatures, is gradually being replaced in hot countries by the more stable freeze-dried vaccines. In South America, centres for the preparation of dried vaccine have been established in several laboratories. In his contribution, Dr D. McClean emphasizes the importance of the studies encouraged by WHO, which are the first to give results relating to the activity of these vaccines in the laboratory and in man under strictly controlled conditions. [2] One of the vaccines studied (that of the Lister Institute of Preventive Medicine) resisted a temperature of 45°C for 64 weeks without any appreciable loss of potency, and then gave 100 % successful vaccinations. Vaccine lymph may be purified by differential centrifugation which eliminates any fragments of tissue, 5 % peptone being added as a protective agent. Those who have had the opportunity of using the vaccine in the field are unanimously of the opinion that once the vaccine has been

[1] *Bol. Ofic. sanit. panamer.*, 1957, **42**, 109-172

[2] Cockburn, W. C. et al. (1957) *Bull. Wld Hlth Org.*, **16**, 63

reconstituted it deteriorates rapidly at room temperature; it must therefore be used immediately, or if it is preserved at 0° - 4°C, within 7 days of being reconstituted.

Inactivated vaccines

Vaccination with inactivated vaccine would obviate the disadvantages of administering live vaccine to certain persons. For the present, experiments have been limited to animals, and according to Dr McClean, who has conducted these experiments, inoculation of rabbits and monkeys with vaccine irradiated with ultraviolet light makes these animals resistant to the live virus and stimulates the formation of antibodies. In the rabbit, inoculated with two successive doses at a two weeks' interval, immunity persisted for 22 weeks and was prolonged by booster injections. The ultraviolet dosage and the time of exposure are important; excessive irradiation destroys the antigenic power of the virus.

The cutaneous reactions caused by irradiated vaccine and the titre of the circulating antibodies are less than in the case of a live vaccine, and it may therefore be concluded that the irradiated vaccine acts in the same way as a killed vaccine. Experiments in inoculation of chick-embryos with irradiated vaccine in a fortyfold concentration did not reveal the presence of any live particle. This vaccine also lends itself satisfactorily to freeze-drying.

Vaccines cultured on chick-embryo

The method of preparing smallpox vaccine by culturing the virus on the chorio-allantoic membrane of the chick-embryo, which was perfected more than twenty years ago, has been used for human vaccination by several workers. Dr J. V. Irons and Dr E. B. M. Cook point out that this method has certain advantages. First, it is easy to obtain pure vaccine without the adventitious contamination which is almost inevitable when calves are used; secondly, large quantities can be produced in a short time and at relatively low cost; thirdly, it can be prepared by laboratories which do not have the necessary facilities for housing livestock. The abovementioned authors have recently seeded the virus in the allantoic sac of embryos on the eleventh day of incubation and in this way have succeeded in cultivating the virus over the whole surface of the chorio-allantoic membrane. By this method, about 200 doses of vaccine are obtained per embryo as against 60-65 with the old method, in which only a part of the membrane is seeded. In the light of Dr Irons' statement, the participants agreed to recommend that laboratories preparing smallpox vaccine try this technique as a means of overcoming any difficulties which might arise from a shortage of animals. It is noteworthy that the 500 000 doses of vaccine made available by the Bacteriological Institute of Chile were cultured on chick-embryos.

Vaccines prepared on tissue cultures

In his communication, Dr McClean mentions a method of preparing vaccine—perfected by Wesslên in Sweden—which is of great potential importance. In this method the virus is cultured on the skin of bovine embryos suspended in amniotic fluid. This vaccine is used in Sweden, and there seems every probability that it would be suitable for the preparation of dried vaccine. The cultures are made in Roux flasks. The quantity obtained from the skin of a 3-4 month embryo is the same as that obtained from a calf or sheep. This technique does not require the culture of the cutaneous tissue; the virus is cultured on cells which are still living but no longer growing. From the points of view of sterility and economy this vaccine has the same advantages as that prepared on chick-embryo and, indeed, has one definite advantage over the latter in that it maintains the virus culture on bovine tissue. Dr Else Krag Andersen mentions that in Denmark the virus is cultivated on the liver of two-day-old female rabbits infected intracutaneously.

Potency-testing of vaccines

It is evident that results obtained from everyday vaccinations and from systematic

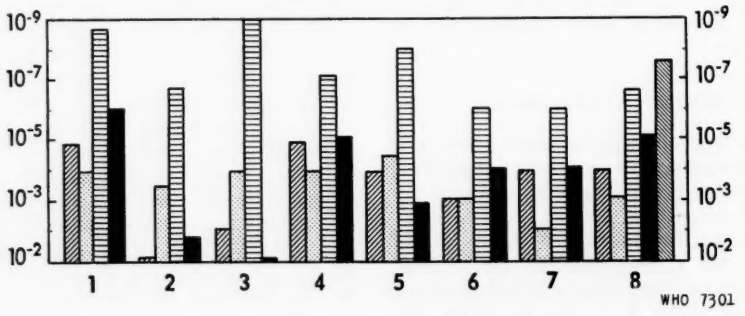
campaigns are the best proof of the efficacy of a vaccine. Nevertheless, preliminary potency tests in the laboratory are essential. Titration methods vary, however, from country to country and from laboratory to laboratory, and different results may be obtained with the same vaccine. This is the reason for the considerable difficulties encountered up to the present in standardizing smallpox vaccines. Not only are there difficulties resulting from qualitative differences between vaccines, but very little is yet known of the relation between laboratory results and the results of human vaccination. It is, in fact, in this particular field that the above-mentioned studies, carried out under WHO auspices, have been of paramount importance. Dealing with this matter, Dr Else Krag Andersen reviews the following titration methods: (*a*) intradermal titration in rabbits; (*b*) titration by scarification, also in rabbits; (*c*) pock-counts on the chorio-allantoic membrane of chick-embryos; and (*d*) determination of the cytopathogenic action of the vaccine on tissue cultures.

Chick-embryo titration, i.e., pock-counts on the chorio-allantoic membrane, is perhaps the most promising method. The embryos are inoculated on the eleventh day of incubation with tenfold virus dilutions (5-6 embryos per dilution) and, after three days' incubation at 36°C, a count is taken of the pocks which have developed on the chorio-allantoic membrane. The titre is expressed by the number of infective particles per ml of vaccine dilution, each pock being assumed to be caused by one particle of virus. This method, in spite of certain disadvantages (such as the convergence of pocks and irregular rates of development), is more accurate than the scarification technique on the skin of the rabbit; it has made it possible to fix the titre which will obtain the highest possible number of successful vaccinations at 10^8 IU/ml. However, Dr Krag Andersen believes this to be somewhat too strict a standard, since higher dilutions have been found satisfactory in certain cases.

Tissue-culture titration by determination of the cytopathogenic action of the virus is still in the early stages, but this method may be developed both for titrating vaccines and for detecting the presence of contaminating viruses.

The differences in titre obtained with these different methods on eight vaccines are clearly indicated in the accompanying figure. In addition to the techniques mentioned

SMALLPOX VACCINE TITRES OBTAINED BY DIFFERENT METHODS



Vaccine dilutions

1. *Calf (Denmark)*
2. *Calf (Uruguay)*
3. *Calf (Ecuador)*
4. *Buffalo calf (Bandung)*
5. *Sheep (England)*
6. *Egg*
7. *Rabbit liver (experimental use)*
8. *Skin of calf embryo (Sweden)*

Intracutaneous injection (rabbit)
Scarification (rabbit)
Pock count (egg)
Mortality in infant mice
Tissue culture

above, the figure also shows the results obtained by determining the minimum lethal dose for two-day-old mice inoculated by the intrapulmonary route. The data give some idea of the complexity of the problem of establishing an international standard of potency for smallpox vaccine—a problem to which WHO is devoting attention.

A number of recommendations and conclusions were approved by the participants in the seminar, as follows:

(1) An attempt should be made to obtain lymph, and consequently vaccine, with a low bacterial content, the ultimate aim being the production of a bacteria-free vaccine.

(2) Dried vaccine should be used in campaigns in areas where there are no refrigeration facilities.

(3) Before dispatch, every batch of dried vaccine should be tested by keeping samples at a temperature of 37°C for one month, after which they should satisfy each country's minimum purity and potency requirements for glycerinated vaccines.

(4) The expiry date should be given for every batch of vaccine, counted from the time of distribution and fixed in accordance with local conditions.

(5) Every batch of vaccine, after being subjected to full safety and potency tests in the laboratory, should be tested in man before general use.

(6) All laboratories producing vaccine should send samples at least twice yearly, through the Pan American Sanitary Bureau, to a specialized central laboratory. This would be in their own interests and would also be a method of co-operating in studies towards the establishment of an international standard.

(7) Laboratories producing vaccine should also carry out research to improve their vaccines and to develop the use of other sources of virus production.

(8) Since a continent-wide programme of smallpox eradication is under way, it is essential that public health laboratories in every country be equipped for carrying out smallpox diagnosis tests.

(9) Countries which have not yet eradicated the disease should be recommended to carry out smallpox eradication campaigns in accordance with recommendations of the Thirteenth and Fourteenth Pan American Sanitary Conferences.

(10) From the international epidemiological viewpoint, no distinction should be made between smallpox and alastrim.

PUBLIC HEALTH ASPECTS OF CHRONIC DISEASE

The more rapidly human knowledge expands, the greater is the number of fresh problems created. In medicine, the advances of the last fifty years have brought about a spectacular increase in life expectancy, but this has been paralleled by a rise in the morbidity and mortality from chronic disease. Public health workers are unwilling to accept this as an inevitable consequence, however, and are resolved to make a determined attack on ill-health in all its forms and in whatever section of the population it occurs.

It was in this spirit that public health workers from 12 countries, as well as a small number of experts in chronic diseases and related fields, met in Amsterdam from 30 September to 5 October 1957 at a Symposium on the Public Health Aspects of Chronic Disease, organized by the WHO Regional Office for Europe.

In order to limit the field sufficiently for profitable discussion, it was decided to exclude congenital and acquired defects, mental disease and communicable diseases—which have already received considerable attention from public health authorities—and to focus attention on four major disease groups, exemplifying particular aspects of the

chronic disease problem. The four groups chosen were : malignant neoplasms, diabetes mellitus, cardiovascular diseases and rheumatic diseases. Prime consideration was given to the age-group which is important for the diseases of later working life, i.e., 40-64, although it was recognized that none of the chronic diseases under discussion is confined to this age-group.

Papers dealing with various aspects of chronic disease—epidemiology, early detection, etiology, treatment, rehabilitation—by experts in the fields concerned were read at the Symposium and served as a basis for the subsequent discussions. Prior to the Symposium, a questionnaire on existing morbidity studies, problems and programmes in the field of chronic diseases was sent to the governments of the participating countries and a summary of the replies was circulated in advance to the participants.

What is chronic disease ?

A satisfactory definition of chronic disease must incorporate both the medical and the social aspects. The following definition was agreed upon by the Symposium : " Chronic disease is an impairment of bodily structure and/or function that necessitates a modification of the patient's normal mode of life, and has persisted, or may be expected to persist over an extended period of time ".

It was not considered either practicable or desirable to suggest a definite period as a minimum ; for general public health purposes, the chronicity of a disease is determined more by its character than by its duration. Administrative, social and economic considerations are also involved ; and, as new treatments are discovered, diseases which are classed as chronic today will not necessarily remain so.

The " public health aspects of disease " were taken to include all activities that can be carried out by public and voluntary health organizations, scientific institutions, and individual people to prevent and control disease and to promote health. The chronic diseases offer a particularly difficult problem on account of their obscure etiology, insidious onset, and multifarious symptoms. At present, not enough is known about their prevalence, natural course, and the amount of disability they produce—all factors affecting the importance of a disease as a cause of human suffering and an economic burden on the community. There is evidence, however, that, through loss of manpower, the chronic diseases have an exceedingly damaging effect on the productivity and welfare of the countries of Europe, and that they account for a major part of the total cost of sickness.

Prevention of chronic disease

The ideal way to control the chronic diseases would be to prevent their occurrence, either by eliminating the causes or by some form of prophylactic treatment. Unfortunately, only in a few of the diseases discussed at the Symposium is either of these procedures a practical possibility for the time being. Nevertheless, there are certain public health measures that can be taken to decrease the prevalence of the chronic diseases, or at least to arrest them at an early stage, before disability results.

Prevention in the strict sense of the word —action which removes the possibility that a disease will ever occur—has been termed " primary prevention ". Action which halts the progress of a disease at its incipient stage and prevents complications has been called " secondary prevention ". As a rule, primary prevention is possible only if the etiology of the disease is known. A number of etiological factors were considered at the Symposium, including heredity, nutrition, habits of life, environmental, social and economic conditions. Since the etiology of the chronic diseases under discussion is still largely obscure, however, primary prevention is not a practical proposition in most cases.

Secondary prevention

Until more is known about the etiology of the chronic diseases, public health measures must be based mainly on secondary prevention. This implies early detection and diagnosis, followed by prompt treatment and rehabilitation. Ideally, periodical health

examinations would serve the purpose of secondary prevention very well, but the resources in money and manpower required would be too great for such a policy to be applied to the entire population. Moreover, apart from the fact that the average general practitioner is too busy treating the sick to carry out comprehensive health examinations, most physicians are still inadequately trained in the preventive aspects of medicine. On the other side, it is difficult to persuade people who are apparently well to submit themselves to periodical health examinations.

As a way out of this difficulty, many public health workers have turned to the technique of screening. This relies upon a series of tests, examinations or other procedures which can be applied rapidly and are designed to provide presumptive evidence of the presence or absence of one or more specific diseases. A screening test is not intended to be diagnostic ; persons with suspicious findings must be referred to their physicians for diagnosis and treatment. Screening affords a means of bringing the benefits of early detection to large groups of the population. In the United States of America it has been found that, when screening tests are organized on a group basis with proper educational effort, it is usual for 80-90 % of those eligible to participate.

Multiphasic screening

Many of the screening tests used for different diseases can be conveniently combined ; and by a suitable combination it is possible to screen simultaneously for tuberculosis, diabetes, anaemia, syphilis, glaucoma, hypertension, hearing defects, and certain forms of cancer and heart disease. This has been termed multiphasic screening. Such a survey does not take very much longer than screening for a single disease and has obvious advantages for the person examined. From the administrative point of view, it represents a considerable saving. Only a single campaign of health education needs to be carried out before the screening programme starts, and a single record system can be designed to take all the results. The laboratory services can also be readily adapted to a multiphasic programme, thus effecting a considerable saving in personnel.

Screening tests will be successful in the secondary prevention of chronic diseases only if they are properly integrated into the regular medical services of the country. Without follow-up for diagnosis and treatment, screening tests are useless. The suggestion was made that those administering the screening programme should not only refer persons with suspected disease to their regular physicians, but should also ask the physicians to report back their findings.

Treatment and rehabilitation

The medical care of the patient with chronic disease, whether at home or in an institution, is predominantly the responsibility of the doctor in direct relationship with the patient. Although there are circumstances in which the admission of a patient to a hospital, nursing home or other institution is unavoidable, the Symposium was definitely of the opinion that home care should be given preference over institutional care. This means that specialized home-care services must be provided, and may also involve minor structural alterations in the home to enable the patient to be properly nursed there.

In the modern treatment of chronic disease, great emphasis is laid on rehabilitation of the patient, i.e., restoration of as much as possible of any lost function, and re-integration of the patient into society. This is a fairly new concept and many physicians are still unaware of the possibilities of rehabilitation in chronic disease. To be of maximum benefit, rehabilitation must be begun early —ideally as soon as the diagnosis is made. The provision of the necessary facilities for early detection and treatment is thus an important function of the public health services.

Rehabilitation of the rheumatic patient

Rheumatism accounts for approximately one-tenth of industrial disablement—a figure which has been found to be nearly constant for all countries in both hemispheres in which surveys have been made. The rehabilitation

of the rheumatic patient is therefore a public health problem of first importance.

Rehabilitation in the full sense must aim at securing a regression of the functional disorders caused by the rheumatic lesions and at teaching patients to make maximum use of the physical capacities left to them. Rheumatic deformities should be prevented and an attempt made to increase, or at least maintain, articular mobility.

The Symposium agreed that rehabilitation of the rheumatic patient could best be carried out in special centres devoted solely to this purpose. Such centres should be equipped with all the necessary apparatus and facilities for kinesiotherapy—the fundamental basis of rehabilitation—and the various forms of thermal therapy, physiotherapy and hydrotherapy. One of the advantages of such a unit is that it fosters emulation between patients with similar problems. The rheumatic patient has a peculiar psychological outlook, conditioned by his physical handicap and the long-drawn, painful progress of the disease. He may easily become discouraged in the face of the swift rehabilitation of a patient with a broken wrist or even an amputation.

Remedial exercises are fatiguing for the patient. It is therefore an advantage if he does not have the additional strain of travelling backwards and forwards to the centre. Moreover, at an in-patient clinic the whole day can be devoted to treatment and rehabilitation ; and the risk of the patient returning to work too soon is also avoided. Where such centres are not available, mobile units may be provided for rehabilitation. With regard to the organization of treatment facilities in general, the Symposium endorsed the remarks of the WHO Expert Committee on Rheumatic Diseases. [1]

The final goal of all treatment is vocational rehabilitation, and a special vocational guidance service can give valuable help here. Careful clinical and functional observation of the patient from the time treatment is commenced is the basis of all vocational guidance. By keeping an exact record of the results of various types of dynamometric and psycho-technical tests, and of the patient's ability to carry out different exercises and movements, it is possible to establish a register of aptitudes, including all the different types of work which the patient may or may not be allowed to do, and these can be set against the activities involved in each trade.

The Group suggested that the three main problems to which WHO and the national health administrations should devote their attention were : organization of rehabilitation facilities, occupational forms of rheumatism and their prevention, and the re-employment of rehabilitated patients.

Care of the diabetic

It is essential that the diabetic patient should be educated to carry out his own treatment and to be self-supporting. Nevertheless, regular examinations are necessary, not only to observe the progress of the disease itself, but also to keep a watch for infections and so-called degenerative lesions, such as atherosclerosis, retinopathy and nephropathy.

One of the main difficulties is the dietary management of the patient, particularly in the diabetic woman of forty or over, who has a marked tendency to overweight. Obesity is not a problem of the diabetic patient alone, however, but is believed to promote the development of other chronic diseases as well. Dietary education might therefore be profitably directed at the general public in countries where obesity affects a considerable proportion of the population.

The Group felt that the medical care of the diabetic patient should be mainly the responsibility of the general practitioner, while the public health administration should provide the necessary auxiliary services—nurse, dietician, laboratory technician, and, possibly, social worker. Although part of the medical care and follow-up of the diabetic patient needs to take place in the doctor's consulting room, home visiting promotes the chances of successful treatment. Dietary education is usually more effective in the home of the patient, and the visiting physician may discover an unhealthy situa-

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1954, 78

tion in the home which would otherwise remain undetected.

Care of the cancer patient

Cancer differs from the other chronic diseases discussed by the Symposium in that, in certain sites, it may be curable if detected soon enough. Early diagnosis and radical treatment are therefore the essential means of control of the disease. The Group recommended the setting up of cancer centres, with specialized personnel and technical facilities, for the treatment of patients with cancer at an early stage. Such a centre might be a separate entity or a special department of a general hospital.

Where a cure is uncertain or impossible, additional services will be needed. Wherever circumstances allow, the patient should be treated in his own home under the supervision of his regular doctor, who should be able to call upon such nursing and domestic assistance as may be required. If the disease progresses despite all treatment at home, or if the patient is quite helpless, it is undoubtedly best for him and most economical for the community if he is placed in an institution designed to provide facilities for long-term nursing and some treatment. On the other hand, it is not desirable for moribund patients to be concentrated in such institutions, as the frequent deaths will have an extremely depressing effect on the patients, their families and the nursing staff. Since the average number of bed-days is relatively short for moribund patients, it seems economically justifiable, as well as more humane, to send them to general hospitals. Modern palliative treatment can do much to alleviate the suffering of the incurable cancer patient and should always be available.

Social security

To meet the needs of the patient with chronic disease, a comprehensive system of social security should cover the cost of medical care and rehabilitation for as long as required, and should provide cash benefits in the case of incapacity for work, or invalidity pensions where the incapacity is permanent. In the majority of European countries, insurance schemes or health services are in operation which provide medical care, other than hospital treatment, for as long as the patient remains protected, or at least for long periods. On the other hand, hospital care is usually limited, the maximum duration being usually the same as for cash sickness benefits. After this period has expired, the patient is no longer insured until he resumes work liable to insurance. If he continues to be incapacitated, however, invalidity insurance may intervene with a pension.

The International Labour Office has dealt with the subject of medical care, sickness cash benefits and invalidity pensions in a number of international instruments, setting up minimum standards and guiding principles of social security. One of the problems is to establish proper co-ordination between sickness and invalidity insurance. The distinction between curable and incurable conditions has not proved wholly satisfactory, however, partly because medical science is constantly extending the limits of curability, partly because invalidity insurance and sickness insurance often employ different criteria.

The Symposium arrived at the following conclusions :

1. Provisions for medical care should not only include treatment and nursing care services for an adequate period, but should be extended to services for the early detection of chronic disease and to rehabilitation. Where rehabilitation is at present provided by social security schemes it is usually limited to post-traumatic conditions. The need for extending this service to chronic diseases as well should be recognized.

2. It is very desirable that fuller co-operation should be developed between the public health services, the social security administrations, and any other agencies concerned with the provision of medical and social care.

Health education

Education of the public in the principles of healthy living is an essential public health activity. At the same time, it is one of the most difficult aims to achieve since it may

mean changing habits and ways of life which have deep roots in the past. It may also mean revising preconceptions about the nature and causation of disease that have long been firmly established within the family or the community.

It must be remembered, too, that the injurious effects of behaviour patterns are usually remote and that any statistical demonstration of a relation between a pleasurable habit and chronic disease poses for the individual the problem of chance. He will tend to argue that, in the operation of chance, he will escape and others will be the sufferers. Emotional judgments weigh strongly against intellectual arguments.

As far as chronic diseases are concerned, a further difficulty is that the health educator has little sure etiological knowledge on which to base his teaching. Moderation in food, alcohol, and tobacco, and a reasonable balance between work and leisure and between rest and physical activity are generally accepted as helping to reduce the liability to many chronic diseases, or to mitigate their severity. Obesity is believed to predispose to hypertension, atherosclerosis and diabetes, although the Group considered that the causal relationship between diet and atherosclerosis was not sufficiently well established to justify specific recommendations to public health authorities. In the case of diabetes, the possible risks of intermarriage might be explained.

Research

The lack of sufficient scientific knowledge on which to base an effective policy of prevention and control of chronic diseases has already been stressed. The Symposium attached great importance to the need for further research, not only within the medical field but also in the social sciences.

Medical research may be divided broadly into laboratory, clinical and epidemiological research. Of the three, epidemiological research is the least used and least understood, yet its techniques are no more difficult and its potential contributions to knowledge no less important than those of the other two methods.

The epidemiological method is essentially statistical, based on the collection and study of numerical data. Sometimes the data are derived from national or local vital statistics, sometimes from observation of special groups of the population. In mortality records, the items principally used as a basis for epidemiological study are time trends, sex and age distributions, area differences, occupation, social class and other personal attributes, cohort mortality, and loss of expected years of life. A large number of sources of morbidity statistics suitable for epidemiological study are discussed in the third report of the WHO Expert Committee on Health Statistics.[2] During the last decade or so, attempts have been made in several countries to organize comprehensive systems of hospital morbidity statistics. Analysis of the clinical records of doctors in general practice has been attempted with encouraging results in England and Wales during the last few years, and gives every indication of providing a regular source of morbidity statistics, suitable for epidemiological research on an extensive scale.

For chronic diseases of very long duration, "longitudinal" methods of study have been designed. The elaborate registration systems for cancer that have been set up in some countries provide statistics not only on the incidence of the different forms of cancer, but also on the prospects of survival for one, two or more years, according to sex, age, stage and histology of the growth, and the type of treatment given.

Many epidemiological problems are not fully amenable to statistical treatment, however, and it has been said that "there is more in epidemiological research than statistics". It is also necessary to bear in mind the possible influence of factors which have not been measured or which do not lend themselves to numerical assessment.

The Symposium gave special consideration to research into the factors responsible for the etiology of atherosclerosis.[3] A variety of factors have been recognized to be of possible etiological significance, but so far

[2] *Wld Hlth Org. techn. Rep. Ser.*, 1952, 53

[3] See also *Wld Hlth Org. techn. Rep. Ser.*, 1957, 117, 38-40.

no conclusive evidence has been produced of the part played by any of these. It is generally assumed that two or more factors are involved and that exogenous and endogenous factors act side by side. The Symposium made the following suggestions for future research :

1. Greater use should be made of epidemiological methods, including studies of a more experimental nature, e.g., on selected populations or groups in which the prevalence of one particular factor seems to be causally related to the presence or absence of atherosclerosis.

2. Studies should be made on persons who have survived a first attack of coronary occlusion, in an attempt to correlate survival time with food habits, smoking, work, family situation, etc.

3. The WHO Regional Office for Europe should instigate research into the reasons for the large differences among European countries in the recorded mortality from atherosclerotic and degenerative heart disease, with the object of discovering whether these differences are genuine or have a diagnostic, nomenclatural or statistical explanation. It would be expedient to extend the investigation to other important causes of death, such as cancer.

4. In view of the rapidly accumulating evidence of the importance of nutrition—and especially of diets rich in saturated fatty acids—for the development of hypercholesterolaemia and possibly for the high incidence of atherosclerosis in certain countries, particular attention should be paid to this problem when drawing up national and international research programmes.

Research in the social sciences

The Symposium also examined the possibilities of research in the social sciences. Owing to the complex nature of the problems of chronic disease, the methods of the social sciences cannot be expected to throw any sudden light upon them, but there was general unanimity about the desirability of more joint research between public health workers and sociologists. Past experience has shown, however, that to be successful, such co-operation must be carefully organized. The following recommendations were made :

1. WHO, preferably in conjunction with FAO, should study the possibility of bringing together public health workers, clinicians, nutritionists, medical sociologists, social anthropologists, and social psychologists in order to frame programmes of research into food habits and addiction in relation to chronic diseases, and the ways in which they can be changed.

2. Institutes engaged in research on the public health aspects of chronic disease should have available the services of a medical sociologist. If possible, a medical sociologist should be appointed as a regular member of the staff.

3. Medical and public health students should be given some instruction in the aims and methods of the social scientist, so that they appreciate the contribution the social sciences can make towards public health administration and research.

4. Data already in the possession of medical and non-medical organizations and research institutes on the social aspects of chronic disease—etiology, treatment and medical care—should be turned over to the medical sociologist.

5. In population groups which seem to offer special opportunities for the elucidation of problems relating to chronic diseases, new research projects should be started with the collaboration of medical sociologists. In countries now receiving technical aid, for example, studies might be made of the rapid change in social structure and its effect on the incidence of certain diseases.

AIR POLLUTION: A MENACE TO PUBLIC HEALTH

One of the consequences of the industrialization of Europe has been the uncontrolled discharge into the air of increasing quantities of smoke, particulate matter and waste gases. Since the War, anxiety has been growing about the grave danger to public health represented by this constant pollution of the atmosphere. The WHO Regional Committee for Europe, discussing this problem at its 1955 session, came to the conclusion that a combined effort by the countries of Europe was required for its solution.

As a first step towards implementing this recommendation, a Conference on Public Health Aspects of Air Pollution was convened by WHO in Milan from 6 to 14 November 1957. The Italian Government and the Administration of the Province of Milan generously collaborated in the organization of the Conference. Twenty-one European countries[1] participated, and the United States, the European Coal and Steel Community, and the Organization for European Economic Co-operation also sent observers. Professor G. A. Canaperia, Director of International and Cultural Affairs, Office of the High Commissioner for Hygiene and Public Health of Italy, was in the chair.

In addition to arranging a series of general meetings, at which papers presented by experts were subject to general discussion, the organizers of the Conference set up two working groups, one to study the sanitary and engineering problems involved in prevention of air pollution, the other to consider the public health and administrative aspects. Reports prepared by these two Groups were afterwards submitted to the Conference and the problems requiring further investigation were summarized in plenary session.

The situation

"Air pollution is not only a difficult problem; it is for several countries a new problem." This statement in the final report of the Conference epitomizes the present situation. A questionnaire circulated to all participating countries before the Conference revealed, however, that there is widespread recognition of the increasing seriousness of air pollution and of the urgent need to take active measures against it. On the other hand, the replies showed a varying degree of administrative and technical control in different countries. Few personnel are specially appointed to deal with the many aspects of prevention and control, and training facilities are inadequate. In short, none of the participants was satisfied with the present situation, and disquieting fears were expressed about the possible long-term effects of air pollution.

Biological effects

Several countries gave striking examples of ill-effects on man, animals and plants caused by air pollution. In Belgium, deaths from chronic bronchitis are higher in the industrial provinces of Liège, Namur and Hainault than in other provinces. In the United Kingdom it is estimated that, in the Thames Valley, smoke-polluted fog was responsible for 3500-4000 deaths in four days in December 1952, and that a similar but less severe incident in 1956 caused 1000 additional deaths in Greater London. The health of schoolchildren is reported to have been adversely affected in some districts of Poland where smelting and similar industries are concentrated. A shale-oil factory at Kvarntorp in Sweden gives off roughly 12 tons of dust, 200 tons of sulfur dioxide and 1200 cubic metres of hydrogen sulfide in 24 hours. Fatigue and discomfort, as well as minor illnesses and respiratory symptoms, including bronchitis, have been found to be more common among people living near the factory than in the rest of the population. Harmful effects on plant life have also been observed in the neighbourhood of this and

[1] Austria, Belgium, Bulgaria, Denmark, Finland, France, Federal Republic of Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and Yugoslavia.

other shale-oil factories, iron and copper works, phosphate factories, carbon bisulfide factories, sulfate cellulose plants and electro-chemical factories. Pollution from fluorine compounds had such serious effects on cattle in the Netherlands that some of them had to be slaughtered, and in Germany animal losses have occurred in the neighbourhood of factories releasing arsenic compounds and metallic dusts into the air. In Yugoslavia, peasants are deserting the village of Rudare, near Trepcar, on account of the high animal mortality, and in the Bor region, vegetation has been practically destroyed in a belt 17 km long and 12 km wide. Animals and plants have suffered in the neighbourhood of aluminium factories in Switzerland, while in Finland, a sulfuric acid plant and some other factories have had to pay heavy compensation for damage to crops and material.

Although the Conference was in general agreement on the reality of the deleterious effects of air pollution on the health, comfort and well-being of the community, the difficulty of obtaining conclusive proof of a direct relationship was felt to be a serious handicap to effective action. It was pointed out that conclusions drawn from a comparison of mortality and morbidity rates in different countries could be highly misleading. Particular interest was shown in the interview survey methods that had been used in some countries to ascertain how much discomfort and annoyance air pollution causes, and its possible relationship to minor illness. There is a wide field here for further research into such questions as the relationship between air pollution and certain well-known respiratory and infectious diseases, the occurrence of minor illness and discomfort following air pollution, and the positive value of fresh air in the maintenance of health. Nevertheless the Conference was satisfied that there was sufficient information available to press for immediate action.

Measurement of pollution

The Conference recommended that all countries should make systematic measurements of air pollution and that the apparatus used should be standardized. Measurements taken at the same time and place with different types of instrument give different results. It was felt that some simple but reliable apparatus should be developed—OEEC and other bodies are already working on this problem—and recommended for general adoption. It such an apparatus could be mass produced, the cost would be kept to a minimum. Standardization is needed, however, not only with regard to the apparatus and the physical and chemical agents to be measured, but also with regard to the technique and the interpretation of the results. An international glossary should also be compiled to ensure uniform terminology. It was felt that it should be possible even at this stage to reach an internationally acceptable expression of results.

While relatively simple procedures are of value in giving a general assessment of the degree of pollution in an area, well-equipped centres with adequately trained staff are essential if a thorough study is to be made. It is important that those engaged in such work should have at their disposal information on the meteorological conditions, and particularly on the micrometeorological conditions, at the time of measurement. The possible hazards of ionizing radiations in the air should also be borne in mind and routine measurements made.

Control measures

There was general agreement that the control of air pollution would never be completely effective without the creation of an informed public opinion. Education of the general public—particularly of the younger generation—was therefore considered to be a matter of the greatest importance.

The Conference felt strongly that, in spite of the present lack of basic knowledge about the nature, sources and allowable levels of pollutants, there was much that could be accomplished immediately. A recommendation is to be sent to all countries on the value of setting up national advisory bodies on air pollution, representative of all interested

parties. Public health personnel, sanitary and chemical engineers, industrialists and workers in related fields—meteorologists, town planners and architects—must be brought together to find the most satisfactory solutions.

In a number of countries, engineering control measures are already functioning well, but there is still much that could be done. It was the unanimous opinion of the Conference that prevention is better than cure and that efforts should therefore be concentrated on controlling pollution at the source. Identification, measurement and, of course, control of a pollutant can be carried out most effectively at the point of production in the industrial plant or in the chimney stack, before it reaches the outside air. It was realized that there are some types of industry in which no practicable control measures are possible at present. A valuable step would be taken, however, "if all new industrial establishments of designated categories were required to introduce suitable devices for the routine sampling of aerial effluents at their point of discharge". In this way a further increase in the number of industrial sources of pollution could be prevented.

Not only industrial effluents, but also the exhaust gases of motor vehicles contribute largely to atmospheric pollution. A recent study in Paris showed that in the summer months the fumes given off by motor vehicles accounted for 70 % of the total atmospheric pollution. It was therefore gratifying for the Conference to learn that some motor-car manufacturers are modifying their engine designs in order to lessen the amount of pollution caused. The use of devices such as catalysts, after-burners and mechanical fuel regulators seems to offer considerable promise for the future.

Legislation

It is unlikely that persuasion and education alone will be sufficient to secure an adequate reduction in pollution without some means of enforcing control measures. At present, the introduction of the necessary legislation is hampered by the lack of specific knowledge on the precise effects of air pollution. The Conference felt, however, that the evil results of air pollution are already sufficiently evident to justify immediate action, including, where necessary, legislative measures. It was recommended that national legislation should be kept sufficiently flexible to allow adaptation to meet local requirements.

Conclusion

Air pollution constitutes an increasing but avoidable hazard to the health and well-being of the community. Much information is urgently needed on its precise effects on man, animals and plants, and on the most satisfactory means of control. Nevertheless, sufficient is already known to justify immediate action, including the education of public opinion, the setting up of national advisory bodies, the training of suitable personnel for research and control, routine measurement of pollution, and a wider use in industry of the control devices at present available, backed, if necessary, by suitable legislation. There is a pressing need for standardization of measuring apparatus and techniques, and an international glossary of terms used in work on air pollution would be valuable. The Conference recommended that WHO should arrange for "the collection, translation, condensation and dissemination of information on air pollution, including, as a first stage, the compilation of a list of various organizations and associations concerned with all problems of air pollution". Proposals were also made for a number of research projects. A WHO Expert Committee on Air Pollution met in November to study the problem further. A start has thus been made with the international co-operation advocated by the WHO Regional Committee for Europe; the ultimate aim is to safeguard the health and welfare of the peoples of Europe against the harmful effects of air pollution.

Reports of Expert Groups

HEALTH STATISTICS

The effective planning of public health programmes is, to a large extent, dependent on the availability of statistics on the morbidity and mortality caused by various diseases. In areas where health needs are greatest, however, adequate health statistics are not always readily obtainable. The collection of health statistics in under-developed areas is accordingly one of the principal subjects treated in the fifth report of the WHO Expert Committee on Health Statistics,[1] which met in Geneva from 10 to 14 December 1956. The report also covers such topics as : health indicators ; morbidity statistics ; cancer statistics ; and the work of national committees on vital and health statistics.

Collection of health statistics in under-developed areas

The need for methods of vital and health registration suited to areas in various stages of development was stressed by the Expert Committee on Health Statistics in 1954, and by the Conference for the Seventh Revision of the International Lists of Diseases and Causes of Death in 1955. It was with particular interest, therefore, that the Expert Committee on Health Statistics noted the report of a seminar on vital and health statistics convened in Brazzaville in November 1956 by the WHO Regional Office for Africa and the Commission for Technical Co-operation in Africa South of the Sahara (CCTA).[2] The purpose of the seminar was to review the availability and coverage of health statistics in Africa and to give statisticians in the region the opportunity to meet and discuss problems of common interest.

The Committee welcomed the convening of this seminar as an important step towards the improvement of vital and health statistics in the African continent. It went on to recommend that, in under-developed areas, efforts to improve the collection of vital and health statistics where some kind of administrative machinery is already available should be supplemented by attempts to establish registration systems in places where no information whatsoever exists. The fact that, in a number of areas, a complete and adequate registration system cannot be organized for the time being should not exclude the establishment of simple registration systems which could at least provide information on the natural growth of indigenous populations. The Committee also endorsed earlier recommendations for the establishment of short lists of causes of death suitable for use in areas where auxiliary medical personnel exist, as well as lists to be used in places where only lay sources of information, such as ministers of religion, administrative officials or even village chiefs, are available.

Methods of collecting health statistics will naturally vary according to local conditions, but there should at least be a census of the population and a registration of births and deaths. If it should not be possible to undertake a complete census or registration for the moment, a census taken on a sampling basis or the creation of small registration areas within a particular territory would still be useful. At a later stage, certification of causes of death and the collection of morbidity statistics could be introduced. The goal should be the organization of statistical services in agreement with internationally recommended principles.

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1957, 133, 22 pages. Price: 1/9, $0.30, or Sw. fr. 1.—. Published in English, French and Spanish.

[2] Unpublished document CCTA/WHO/STATS.SEM./35 Rev. 1

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The training of statistical workers for under-developed areas was also discussed by the Committee. These workers fall into three main categories: (*a*) statisticians with university training, including specialization in health statistics; (*b*) "intermediate" staff such as record keepers, local registrars, hospital statisticians, etc.; and (*c*) clerical staff. Plans for their training should take into account the special needs of the area to which they will be assigned. The Committee considered that, in general, personnel of type (*a*) should have the opportunity, through fellowships, of studying at specialized centres abroad, while international regional training courses might be organized for personnel of types (*b*) and (*c*).

Training handbooks

For the training of health statistical workers in general, the Committee recommended that WHO prepare handbooks on such subjects as coding for mortality and morbidity statistics, reporting of communicable diseases, principles and systems of health statistics, and recommended procedures for hospital statistics, including the application or adaptation of the International Classification of Diseases.

Health indicators

"Health, including demographic conditions" was the first of the components of levels of living listed in the report [3] of the Joint Committee on International Definition and Measurement of Standards and Levels of Living convened in 1953 by the United Nations, in collaboration with ILO and UNESCO. After examining the indicators proposed by previous committees and study groups—notably the Study Group on the Measurement of Levels of Health which met in 1955 [4]—as measures of this component, the Expert Committee on Health Statistics recommended the experimental use of the proportional mortality ratio over 50 (deaths at 50 years of age and over expressed as a percentage of total deaths) as a comprehensive health indicator. The Committee also stressed the utility, as a specific health indicator, of the infant mortality rate—and, in particular, the late infant mortality rate (from 1 to 11 months), which, though not so widely available as the infant mortality rate, is less influenced by pre-natal and intra-natal causes of death. The Committee considered the death rate from communicable diseases to be rather limited for the purpose of measuring levels of health, because in many areas medical certification of causes of death is unreliable, or does not exist. Alternatively, the total death rate in the 1-4 age-group might be tried as a specific indicator where accuracy of age-recording justifies its use. The Committee also considered that family living studies and family health surveys could provide valuable data for the local measurement of levels and trends of health.

Morbidity statistics

The Committee discussed the value of sickness surveys, general practitioners' records, and hospital records as sources of information on which morbidity statistics can be based. Surveys, covering either a whole population or a representative sample, are a useful means of obtaining morbidity data, and in some cases the only one; they should however be restricted in scope and duration, and their aims should be clearly defined. The records of general practitioners can be used to complement other sources of morbidity statistics and may, in certain conditions, provide a more complete picture of morbidity from the less serious and non-disabling complaints than is available from hospital records.

There are two principal limitations in the use of hospital records as a measure of morbidity in a community: firstly, the population exposed to risk may not be known, and, secondly, the types of diseases treated in hospitals are not necessarily representative of the total morbidity of a community. Nevertheless, for some parts of the world, hospital statistics are the only source of information

[3] United Nations (1954) *Report on international definition and measurement of standards and levels of living*, New York (Document E/CN.3/179—E/CN.5/299)

[4] A summary of this Study Group's report will appear in a forthcoming issue of the *Chronicle*.

on morbidity and, provided due caution is exercised, a great deal of knowledge of the prevalence of sickness in a community can be gained from them. In the collection of hospital statistics, a distinction should be made between the residents and non-residents of an area so as to relate the data more closely to the population at risk. The Committee recommended that WHO study the forms used for recording hospital morbidity statistics in different parts of the world, and analyse the definitions of terms and rates currently used in these statistics. The purpose of these measures would be to pave the way for the international comparability of statistics based on hospital morbidity records.

Several factors have to be taken into account in the interpretation of morbidity statistics, as distinct from mortality statistics, namely, that there is no clear demarcation between health and sickness, that the onset or termination of sickness may be indefinite, that sickness may last over widely varying periods of time, and that it may recur in the same individual. The Committee recommended that morbidity statistics be accompanied by clear statements of : their purpose and the definition of sickness applied in their compilation ; whether they relate to sickness beginning within the period of observation, to sickness current during this period, or to duration of sickness ; the disease or diseases to which they relate ; the time at which a period of sickness is regarded as having begun or terminated (admission to or discharge from hospital, cessation or resumption of work); the period of observation ; and the denominator (as, for example, the population at risk).

Cancer statistics and registers

For the proper assessment of cancer treatments, a precise classification of tumours by site, histological type, and stage is necessary. The Committee therefore recommended that WHO extend the publication of statistical studies on different types of cancer, increase the distribution of relevant information—particularly on statistical methodology applicable to this field—and continue its efforts to improve the classification of tumours.

It was the view of the Committee that the results of cancer treatment on a wide scale could best be assessed by means of cancer registers. The main purpose of these registers should be to obtain information on the incidence of cancer according to the site and type of the primary growth, and to follow up cancer patients in order to ascertain their period of survival. For such information to be adequate, it is essential that there should be close co-operation between hospitals treating cancer patients and statistical departments recording the causes of death.

In connexion with the forthcoming meeting of a Sub-Committee on Cancer Statistics,[5] the Committee reviewed the work of the previous Sub-Committees on Cancer Statistics, as presented in their two reports,[6] as well as developments in the field of cancer statistics over the past few years. These include : the establishment of cancer registers in several countries ; progress in the histological classification of neoplasms ; new techniques for ascertaining the incidence and prevalence of cancer ; the extension of statistical studies of the etiology of cancer by relating morbidity and mortality statistics to ethnic, climatic, nutritional and other environmental factors ; and the changes introduced in the International Classification of Diseases at its seventh revision.

National committees on vital and health statistics

The establishment of national committees on vital and health statistics was recommended by the Conference for the Sixth Revision of the International Lists of Diseases and Causes of Death (Paris, 1948) ; this recommendation was endorsed by the First World Health Assembly. The main purpose of these committees—of which there are now 33—is to facilitate the exchange of information and views between the various national agencies responsible for the collection of vital and health statistics and, in general, to improve the quality and usefulness

[5] See page 25 of this issue of the *Chronicle*.

[6] *Wld Hlth Org. techn. Rep. Ser.*, 1950, 25, 17; 1952, 53, 43

of such statistics. The Committee recommended that WHO continue its efforts to foster the establishment of national committees of this type, and that regional or inter-regional conferences on health statistics be held from time to time with the technical co-operation of WHO and the active participation of national committees in the area.

PREVENTIVE WORK IN MENTAL HEALTH

Although its value in general medicine is now widely recognized, preventive action has been greatly neglected as far as mental health is concerned. Even in countries with well-developed services for psychiatric treatment, preventive facilities are still embryonic and completely inadequate. The fact that in some European and North-American countries about 40 % of hospital beds are occupied by mental cases shows the danger of this situation.

It is obvious that measures for the prevention of mental disorders must be organized without delay, but it has yet to be decided which of the health services can best undertake this task. This problem is considered in the fifth report of the WHO Expert Committee on Mental Health which discusses, in particular, how, and to what extent, the psychiatric hospital can become a centre for preventive work.[1]

From treatment to prevention

In preventive work more than in any other health activity, the support of public opinion is a prerequisite for success. This is an essential psychological condition, for, faced with indifference, even the best-conceived preventive measures cannot be expected to succeed. There is no doubt that for a long time public prejudice against psychiatry was very strong indeed. The frequent absence of a clear-cut diagnosis, the length and costliness of treatment, and the low proportion of cures aroused general scepticism and made preventive action, and even early treatment, practically impossible.

In recent years, however, there has been some change of attitude because psychiatrists have been obtaining better results owing to greater knowledge of mental diseases and to the application of new methods of treatment to mental patients. The psychiatric hospital is no longer considered as a place where people are put " out of the way " or as a last desperate resort. More and more patients are voluntarily undergoing hospital treatment in the early stages of mental illness, and the resultant number of cures is in turn accelerating the development of preventive work.

In view of this connexion between effective hospital treatment and successful preventive work, it would seem fitting that both should be under the direction of a single body, for example, the psychiatric hospital service.

Structure of the hospital centre

Certain conditions must be fulfilled if a psychiatric treatment centre is to make a success of its twofold function of prevention and cure.

Instead of being isolated and cut off from the outside world like the old-fashioned " asylum ", it should be near—or even in—an inhabited area and consist of one or more medium-sized buildings enjoying as much light and air as possible. An effort should be made to avoid the massive, prison-like type of architecture which was partly responsible for the horror inspired by the institutions of other days.

The psychiatric treatment centre should break away from any suggestion of isolation, since this can only be harmful. It should adopt an " open-door " policy ; visits should be encouraged and formalities for entering and leaving should be reduced to a mini-

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1957, **134**, 18 pages. Price: 1/9d., $0.30, or Sw. fr. 1.—. Published in English, French and Spanish.

mum. No effort should be spared to make the work of the centre known to the outside world, through the press and radio, by arousing the interest of influential local residents, and by encouraging local volunteers to work there. The latters' favourable reports can help towards the acceptance of the treatment centre by the community.

In organizing treatment, respect for the individual must take precedence over every other consideration. Mental patients are much less dangerous than is supposed, and in most cases there is no justification for the "security measures" which turned the old-fashioned "asylum" into a form of penitentiary. The proper "therapeutic atmosphere", on which successful treatment depends, can only be based on an attitude of trust.

In addition to the care of hospitalized cases, the psychiatric treatment centre could undertake other preventive work through out-patient clinics and mobile services. This would have the advantage of keeping the medical team in contact with the general public, and of allowing the patient to stay in his normal surroundings.

There is no doubt that a psychiatric treatment centre organized on these lines would enjoy high prestige in the community, and that its services would be in considerable demand. In particular, it would probably be asked to deal with a large number of chronic or incurable cases never previously notified. How can the centre meet obligations of this kind without neglecting its preventive activities? While it is true that this difficulty will disappear as therapeutic progress reduces the number of new cases, the immediate problem will certainly exist, and in solving it priority will have to be given to preventive action and early treatment of recent cases.

Status of the mental health team

The effectiveness of the psychiatric treatment centre, whether curative or preventive, will always depend to a large extent on the team spirit and morale of its staff. The medical and nursing staffs of psychiatric establishments, whose task it is to lead their patients back to normal social life, are in danger, by the very nature of their work, of losing touch with normal social life themselves. In order to avoid an isolation which is dangerous from both the professional and human viewpoints, and to stimulate the interest of the staff, there should be plenty of refresher courses, information meetings, and contacts of all kinds with the outside world. The report emphasizes the fact that the more the members of the team in a psychiatric treatment centre feel that others are aware of the usefulness and value of their work, the greater will be their satisfaction in it. It is essential for the morale of the medical team to be good, for this will undoubtedly have favourable repercussions on the patients.

* * *

The organization of a psychiatric treatment centre adequately equipped for preventive work is only a first step towards the prevention of mental disorders. Etiological research will make it possible to work out increasingly effective preventive methods; already, present knowledge of certain easily identifiable pre-psychotic conditions could be put to valuable use in the systematic detection of new cases.

OCCUPATIONAL HEALTH

As a result of growing industrialization, occupational health problems are assuming increased importance and urgency. So many clinical cases now come within this particular field of medicine that no physician can do effective work without some knowledge of it. The third report of the Joint ILO/WHO Committee on Occupational Health [1] is principally concerned with training in occupational health, both for general practitioners and future specialists in this field,

[1] *Wld Hlth Org. techn. Rep Ser.*, 1957, 135, 22 pages. Price: 1/9, $0.30, or Sw. fr. 1.—. Published in English, French and Spanish.

and with the ways in which such training can be provided.

According to the Committee, every physician should be acquainted with at least the forensic aspects of occupational medicine, the most common occupational diseases, and the repercussions which industrial employment may have upon other common, non-occupational, diseases. These subjects could be taught during the final year of medical studies. In this connexion, the Committee strongly advocated the institution of university chairs of occupational medicine—still far too rare even in industrialized countries.

It was also felt that the " part-time industrial physician " who regularly devotes some of his working hours to a particular factory or establishment should be better prepared for his task ; he should be required to make a thorough study of his particular industrial sector, and to acquire practical knowledge of the treatment of employees at their place of work. Such further training could be provided through seminars, refresher courses or intensive practical work courses of limited duration, which would not involve the award of a diploma, though participants might receive a certificate.

Specialists in occupational health, on the other hand, in addition to having a first-class training in general and public health medicine, should be thoroughly acquainted with the pathological, psychological and sociological problems relating to their speciality. They should also be sufficiently familiar with the details of the technical and administrative structure of industrial undertakings to be able to collaborate with the other specialists (chemists, occupational guidance officers, administrators, etc.) responsible for working conditions in industry or for the organization of the work itself. The report emphasizes the importance of teamwork by the various technicians ; only by this means will it be possible for each sector to make its problems known and to adapt them to those of the medical service.

The highly specialized training of the full-time occupational health physician will call for at least a one-year post-university course, in either an occupational health institute or some other establishment competent to award a special university diploma. Such training should not be merely theoretical : it should also include practical work in the various industrial sectors, and thorough study of the most urgent local problems of occupational health.

The second part of the report is devoted to study of the scope and organization of occupational health institutes, and their educational, preventive and curative roles. According to local conditions, such institutes may be attached to universities, to public health services, or even to certain industrial undertakings. The report enumerates the various services which should be provided in these institutes, and an annex gives a list of the necessary staff for each service, with respect to three different types of institute.

REVISION OF STANDARDS FOR YELLOW FEVER VACCINE

Every international traveller from a zone in which yellow fever infections occur to a yellow fever receptive area must carry a valid certificate of vaccination against yellow fever. No certificate is considered as valid, however, unless the vaccine employed has been approved by the World Health Organization. This provision, which is contained in the International Certificate of Vaccination or Revaccination against Yellow Fever (Appendix 3 to the International Sanitary Regulations adopted by the World Health Assembly in 1951), was already embodied in a slightly different form in the 1944 International Sanitary Convention for Aerial Navigation. In this Convention, UNRRA played the role which subsequently devolved upon WHO, and established compulsory standards for yellow fever vaccine. These standards have been applied since 1945, but during the

twelve intervening years improvements have been made in the techniques for preparation of yellow fever vaccine, and it has become necessary to make provision for administering yellow fever vaccine by cutaneous scarification. More detailed descriptions of certain potency and safety tests were also felt to be necessary.

The research carried out by various institutes over a period of several years is now sufficiently advanced for new standards to be recommended in place of the old ones. To this end, an Expert Committee on Yellow Fever Vaccine was formed and its report has just appeared.[1]

The recommended revision of the UNRRA standards is set out in detail in an Annex to the report. The three parts of this Annex describe the proposed potency requirements, the proposed safety requirements, and the recommendations to be made for the manufacture of yellow fever vaccine. Separate requirements are formulated for vaccine administered by injection and by scarification.

The following points are made in the body of the report :

Manufacture of the vaccine

The standards established in 1945 included details of manufacturing procedures, thereby hindering manufacturers in the development of new methods. The Committee approached this question in a more liberal spirit and considered that " the minimum requirements, while fulfilling their purpose, should impose as few restrictions as possible on manufacturers of vaccine wishing to improve and develop their products ". It expressed the hope that, if a new type of vaccine should be developed and prove satisfactory, the minimum requirements (recommended and described in its report) would be modified without delay so as to provide for such a vaccine.

Vaccination by cutaneous scarification

The 1945 standards made no mention of this method of administering vaccine which " has been used very widely and with notable success in French African territories, so that at the present day practically no cases of yellow fever are observed there ". It is an effective and inexpensive method. The vaccine can be prepared by culture of the virus in mouse brain, using either the Dakar or the 17D strain. In the Committee's opinion, the local authorities should be left to select the strain in the light of the prevalence of the disease and the resulting morbidity ; it also emphasized the fact that " although vaccination by scarification . . . may be performed by auxiliary personnel it should be supervised by medically qualified staff ", and stated that, " as far as was possible and reasonable, vaccine administered by scarification should pass the same safety tests as vaccine given by subcutaneous injection ".

Mouse protection test for yellow fever

This test is more specific than other serological tests for the detection of yellow fever antibodies. The Committee felt that the " methods to be used for survey purposes should be sufficiently stringent for positive results to be accepted with considerable certainty ", and it recommended the adoption of a reference protection test (the technique of which is described in an Annex to the report) for use in serological investigations of primate sera. The Committee recommended that WHO should study the possibility of establishing an international reference preparation of a yellow fever immune simian serum, and of making available a pool of human sera non-immune to yellow fever. Both these reference sera should be non-immune to other Group B arthropod-borne viruses in order to eliminate complications due to cross-reactions. On rare occasions, the serum of a person infected by a virus related to that of yellow fever may give a " positive " reaction in a yellow-fever protection test.

Post-vaccinal encephalitis

In Europe and Africa, cases of encephalitis, although rare, continue to be reported following vaccination both with the 17D

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1957, 136, 21 pages. Price: 1/9, $0.30, or Sw. fr. 1.—. Published in English, French and Spanish.

strain and the mouse brain strain. It has been noted that these cases tend to occur in groups, either with regard to time or to place, although, in most cases, it has not been possible to establish a relation between the cases and specific lots of vaccine. The age of the persons vaccinated seems to be one of the main factors, since the majority of the encephalitis cases occur among infants under one year old. For this reason, the Committee recommended research on practical methods, other than vaccination, of protecting infants against yellow fever. It was pointed out that what is most urgently needed is a method which would make it possible to protect—even temporarily—an infant on an international journey.

Creation of a central laboratory

Any laboratory manufacturing yellow fever vaccine should be able to conduct safety tests on its own vaccine seed lots. Nevertheless, while expressing this view, the Committee recognized that it would be advantageous to have a central laboratory capable of providing seed lot virus in sufficient quantity. Such a laboratory could carry out the safety tests with greater accuracy and prepare seed lots under the best possible guarantee; it could also serve as a yellow fever vaccine research centre. The Committee recommended that WHO should consider designating a laboratory for this purpose.

Research

The Committee recommended research on a number of subjects, including:

(*a*) the effect of desiccation and of varying conditions of storage on the characteristics and genetic properties of modified yellow fever virus used for vaccination;

(*b*) practical methods, other than vaccination, of protecting infants against yellow fever;

(*c*) the incidence and characteristics of antibodies cross-reacting with yellow-fever virus, and the development of methods whereby such cross-reactions could be detected or eliminated.

* * *

Definitive text of the revised requirements

While formulating its recommendations for revised requirements for yellow fever vaccine, the Expert Committee was guided by the wish to establish a pattern on which recommended requirements for other vaccines might be based, and it proposed that its recommendations should be further studied and, if necessary, amended. A Study Group on Recommended Requirements for Biological Substances has since discussed general principles for formulating international recommendations and has made proposals for reaching definitive texts. Before implementation, the revised requirements for yellow fever vaccine will be scrutinized in the light of these more general proposals. In the context of this broader project of formulating recommended requirements for biological substances, the requirements for yellow fever vaccine remain a very special case, because they will be the basis for the international validity of a vaccination certificate.

Notes and News

Insecticide resistance in Taiwan

The increasing tolerance of vector and nuisance insects to DDT and BHC—the insecticides most commonly used in insect-control campaigns—is a problem that today confronts public health authorities in many parts of the world. No longer now is it reasonably certain that control will be achieved by spraying with residual insecticides. While some strains retain their susceptibility to a particular insecticide for a considerable period, others quickly develop resistance, so that to continue spraying

operations with the same insecticide might be a waste of time and money. Consequently, the importance of finding out whether resistance has developed among the local strains of disease-bearing insects cannot be over-emphasized.

In Taiwan, where insect-control campaigns have been in operation since 1948, insecticidal tests have recently been carried out on a number of insects of medical importance, and the results will shortly be reported by S.Y. Liu in the *Bulletin of the World Health Organization*. In these tests, the susceptibility to DDT of six species of *Anopheles*, one species of *Culex*, one species of *Aëdes* and two subspecies of *Musca domestica*, and to gamma-BHC of a species of *Cimex*, was investigated.

Of the various anophelines examined (*A. minimus, A. hyrcanus sinensis, A. ludlowi, A. maculatus, A. tessellatus* and *A. subpictus indefinitus*), *A. minimus*—the main malaria vector of the island—was found on the whole to be the most susceptible and *A. h. sinensis* the most tolerant. Strains of both these species from certain localities, however, showed a statistically significant difference in tolerance when compared with strains from other localities, though whether this tolerance can be regarded as developed resistance remains to be ascertained.

The larvae of a strain of *Culex fatigans* reared from eggs collected from a village which had repeatedly been sprayed with DDT were found to be far more tolerant to DDT than the larvae of a laboratory colony whose ancestors had been collected about 18 months earlier from the same village.

An interesting result was obtained in the case of *Musca domestica*. Two laboratory colonies of *M. d. vicina* were found to be considerably more tolerant to DDT than a normally susceptible strain of *M. domestica* from England, although the ancestors of one of the laboratory colonies came from a village that had not been sprayed at the time of collection. This puzzling phenomenon has not as yet been satisfactorily explained.

As to the susceptibility to BHC of *Cimex hemipterus*, no significant difference was found between three strains, two of which had previously been exposed to mixtures of DDT and BHC and one of which had not.

Preventive aspects in the teaching of physiology

In recent years, governments and academic circles throughout the world have shown increased interest in preventive medicine, and this has been manifest in both economically under-developed and well-developed countries. While certain measures can be taken to strengthen preventive medicine services immediately, their full development can be obtained only through an adjustment in the education of the future generation of medical and public health workers.

WHO recognizes the importance of studying the possibilities and consequences of teaching preventive medicine to undergraduate students. Physiology is one of the principal pre-clinical subjects which might usefully be studied in connexion with preventive medicine, and a WHO Study Group on the Preventive Aspects in the Teaching of Physiology met in Geneva from 2 to 7 December.

The following experts took part in this meeting: Dr E. W. H. Cruikshank (United Kingdom), Dr J. Gillman (Union of South Africa), Dr Magnus I. Gregersen (USA), Dr Einar Lundsgaard (Denmark), Dr Wl. Missiuro (Poland), Dr Jean Posternak (Switzerland), Dr W. R. Spurrell (United Kingdom), and Dr G. Payling Wright (United Kingdom).

Expert Sub-Committee on Cancer Statistics

A WHO Expert Sub-Committee on Cancer Statistics met in Geneva, from 9 to 14 December, to make a critical analysis of methods for ascertaining the prevalence of cancer, and particularly the system of cancer registries which is being applied in a growing number of countries. It also considered progress made, and still required, in the nomenclature and statistical classification of malignant neoplasms and in the classification of the clinical stages of cancer for a proper assessment of the results obtained by

the various methods of treatment. Finally, it suggested lines of epidemiological investigation concerning cancer and particularly differences in frequency of its various forms which might be due to specific environmental conditions.

Dr Percy Stocks, Senior Fellow of the British Empire Cancer Campaign, acted as WHO consultant for the meeting. The following experts were invited to take part : Dr J. Clemmesen, Director, Danish Cancer Registry ; Dr P. F. Denoix, Director, Gustave Roussy Cancer Institute, Villejuif, Paris ; Dr H. F. Dorn, Chief, Biometrics Branch, National Institutes of Health, USA ; and Dr. W. P. D. Logan, Chief Medical Statistician, General Register Office, London.

Environmental sanitation seminar

A WHO seminar on rural water supplies was held in Singapore from 2 to 20 December for public health administrators, health inspectors, and engineers attached to public health services or public works departments of certain countries and territories of the Western Pacific Region. Participants were invited from : Brunei, Cambodia, Federation of Malaya, Hong Kong, Laos, North Borneo, Sarawak, Singapore, Portuguese Timor and Viet Nam. Through the WHO Regional Office for South-East Asia, health officers from the neighbouring countries of Indonesia and Thailand were also invited to take part.

This was the second of a series of three "zonal" seminars on environmental sanitation held by the WHO Regional Office for the Western Pacific. The first, covering a different group of countries, was held in Taipeh, Taiwan (China), in 1956, and dealt with the collection, disposal and utilization of organic wastes.

Professor F. E. Bruce, of the United Kingdom, visited various countries in Zone II, on behalf of WHO, to assist with preparations for the seminar. Professor Bruce, who is Reader in Public Health Engineering at the Imperial College of Science and Technology, London, has twice visited Greece as sanitary engineering consultant for the WHO Regional Office for Europe.

India holds seminar on communicable eye diseases

A national seminar on communicable eye diseases, sponsored by the Indian Council of Medical Research, the Indian Government and WHO, was held at the Institute of Ophthalmology and Gandhi Eye Hospital, Aligarh, India, from 11 to 30 November. The participants included 20 ophthalmologists from all 14 Indian States, and 2 medical officers from Thailand and Burma respectively.

The purpose of the seminar was to help young ophthalmologists to gain further experience in the clinical and laboratory diagnosis of trachoma, and to study the ways in which the infection spreads. Field demonstrations gave the participants practical experience of methods of field investigation and control measures.

The problem of trachoma has been under study at the Aligarh Institute of Ophthalmology for more than a year, under the joint auspices of the Government of India and WHO. The aim of this research project is to determine the minimum effective course of treatment for trachoma, and other factors on which a mass control programme could be based.

Antimalaria Co-ordination Board and Malaria Symposium

The inter-country Antimalaria Co-ordination Board, which first met in Saigon in November 1956, held its second meeting in Bangkok from 11 to 13 December. The meeting was attended by representatives of the malaria services of Burma, Cambodia, Laos, Thailand and Viet Nam, as well as observers from the United States International Co-operation Administration missions in these countries. The World Health Organization, which convened the meeting, was represented by the Chief of the Malaria Section and the Regional Malaria Advisers for South-East Asia and for the Western Pacific.

The agenda of the meeting included a review of the progress of the malaria programmes in each of the five countries, their

co-ordination, and plans for the future. The Board also considered the question of supplies and equipment and various administrative and technical problems.

The meeting of the Antimalaria Co-ordination Board was followed by a Malaria Symposium held in Bangkok, under WHO auspices, from 13 to 20 December. The participants included members of the malaria services of Afghanistan, Burma, Ceylon, India, Indonesia, Malaya, West New Guinea, Philippines, Taiwan (China) and the Territory of Papua and New Guinea, as well as United States International Co-operation Administration representatives from several of these countries and territories, and representatives of UNICEF. The WHO representatives at the meeting of the Antimalaria Co-ordination Board, together with field staff from various countries in the South-East Asia and Western Pacific Regions, also took part. Dr A. Gabaldón from the Venezuelan Malaria Division was invited by WHO to attend as a consultant.

The main subjects of discussion at the Symposium were : surveillance techniques in malaria eradication programmes, the problem of residual foci of transmission, chemotherapy in malaria eradication, and the present position regarding susceptibility and resistance of vector species to insecticides.

Spraying techniques, including dosage, frequency, formulations, spraying equipment, and schedules, were also discussed. Emphasis was laid on the planning and intercountry co-ordination of eradication programmes.

Health education seminar to be held in Iran

Greatly expanded health education services are needed in almost every country of the Eastern Mediterranean Region to keep pace with the rapid development of the public health services. In view of this, the WHO Regional Office for the Eastern Mediterranean has decided to hold a seminar for health educators and others interested in the improvement of health and welfare in the Region. The seminar will take place in Teheran, from 1 to 14 November 1958, on the invitation of the Government of Iran.

At a meeting in Alexandria in November, the Planning Committee for the seminar suggested that between thirty and forty health workers from the various countries in the Region should be invited to attend, as well as representatives from other interested groups and United Nations specialized agencies. The aim of the seminar will be to define the contribution that the health education of the public can make towards the solution of health problems, and to discuss ways of encouraging health workers of all kinds to take part in health education.

People and Places

Trachoma research in Tunis

An Ophthalmological Centre has been opened in Tunis as part of a programme for the control of trachoma and associated conjunctivitis. This programme is a development of the trachoma control campaign carried out by the Tunisian public health authorities with assistance from UNICEF and WHO between 1953 and 1956.

At the request of the Tunisian authorities, WHO has appointed a virologist — Dr Mario Tarizzo, of Italy — to advise on the conduct of virological research at the Centre for a period of two years, starting in October 1957.

Dr Tarizzo has special experience of this type of work, having served from 1951 to 1957 on the trachoma research team of the Harvard School of Public Health, both in the United States and in Saudi Arabia.

Appointments to anti-yaws projects

The anti-yaws campaign started in Liberia in 1953, with WHO and UNICEF assistance, is continuing successfully. Dr Herbert Dirckze, who has been Senior Medical Officer of Health (Epidemiology), Department of Health, Colombo, Ceylon, for the past three and a half years, was recently assigned to this project as WHO Medical Officer.

Dr T. Rao, who for some years has been in charge of yaws eradication in Hyderabad, India, has joined the international staff of the WHO-assisted anti-yaws campaign in Haiti.

Consultant neurologist for India

A neuropsychiatrist — Dr Edward Zysno, of Germany — has been sent to India by WHO, for a period of two years, to assist the All-India Institute of Mental Health, Bangalore, in its clinical, organizational and teaching activities. One of Dr Zysno's principal tasks will be to continue the electro-encephalographic work initiated at the Institute by a previous WHO consultant. Dr Zysno has had wide experience of neuropsychiatric work in various hospitals in Germany.

Food hygiene expert visits Egypt

Professor Aage Jepsen, of the Royal Veterinary and Agricultural College in Copenhagen, visited Egypt in December, on behalf of WHO, to give a series of lectures and demonstrations on food hygiene and veterinary public health at a post-graduate course for physicians and veterinarians. The course was held at the High Institute of Health, Alexandria. An expert in food hygiene, particularly with respect to meat and milk, Professor Jepsen has served FAO and WHO as a consultant on several occasions, and acted as a discussion leader at the recent seminar on veterinary public health held in Warsaw by the WHO Regional Office for Europe.

New appointment at WHO Regional Office for South-East Asia

Dr A. Zahra, of Malta, will go to New Delhi in the spring of 1958 to take up the post of Adviser in Communicable Diseases to the WHO Regional Office for South-East Asia. Dr Zahra has been in the medical service of the Nigerian Government for the past few years, and was the medical officer responsible for the successful WHO-assisted yaws eradication campaign in the Eastern Region of Nigeria. [1]

Assistant Director of PASB resigns

The resignation has been announced of Dr Carlos Luis González, Assistant Director of the Pan American Sanitary Bureau (WHO Regional Office for the Americas). Dr González, who has been elected Senator for the State of Tachira, Republic of Venezuela, will leave his present post at the end of March in order to take up his legislative duties.

A former Director of Public Health for Venezuela, Dr González joined the staff of the Pan American Sanitary Bureau in 1953, and has been Assistant Director of the Bureau since 1954.

[1] See *Chron. Wld Hlth Org.*, 1957, **11**, 309.